

REMARKS

Claims 1 and 3-19 are pending. Claim 1 has been amended to recite the subject matter of canceled claim 2. The dependency of claims 5, 9 and 10 have been amended so as not to depend from canceled claim 2.

Claims 1 and 11 have been amended to clarify the bonding between the urethane polymer chain and the linkage group happens at the terminal of the urethane polymer chain. In addition, new claims 18-19 have been added to recite a specific bonding configuration between the vinyl polymer chain and the linkage segment. Support for these features can be found at least in paragraphs [0150]-[0151] and the examples of the publication of the present application, US PG Pub 2007/0117902.

No new matter has been added by way of the above-amendment.

Interview

Applicants note with appreciation the courtesies extended by Examiner Salvitti and Mr. Mark Eashoo (SPE) on March 10, 2010 during the personal Interview with Applicants' representative, Garth M. Dahlen, Ph.D., Esq. (#43,575). Applicants note that the Interview Summary form gives an accurate description of the Interview. Further details are given below.

The following sections correspond to the sections of the outstanding Office Action.

Prior Art Based Issues

The following prior art based rejections are pending:

(A) Claims 1-10 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over US. Patent No. 5,320,769¹ to Bontinck et al. ("Bontinck") in view of U.S. No. 5,840,880 to Joffre et al. ("Joffre"); and

¹ Applicants note that the Examiner's description of the rejections refers to "U.S. Patent No. 5,320,769" to Bontinck et al. However, in the Notice of References Cited (Form PTO-892) attached to the outstanding Office Action, the Examiner indicates that the patent number associated with Bontinck is U.S. 5,541,251. During a telephone conversation with the Examiner on January 20, 2010, the Examiner indicated that the claims are rejected based on the reference to Bontinck et al. (US 5,541,251).

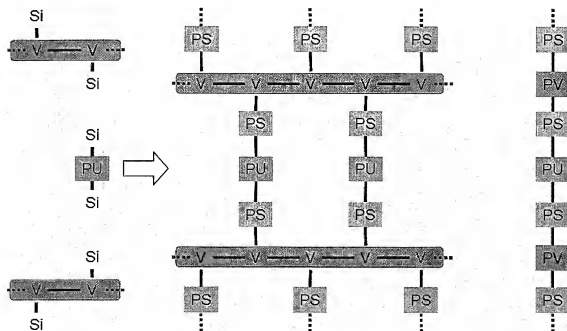
(B) Claims 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,320,769 to Bontinck in view of U.S. Patent No. 5,840,800 to Joffre.

Applicants respectfully traverse the rejections.

In order to further distinguish the present invention from the teachings of the cited references, Applicants have amended claim 1 to recite the subject matter of claim 2, that is that *the urethane polymer chain is a residue of a urethane polymer (A) having at least one silicon-containing hydrolyzable group, and the vinyl polymer chain is a residue of a polymer derived from an ethylenically unsaturated monomer (B) and a compound (C) which is a compound that comprises at least one functional group reactive with a silicon-containing hydrolyzable group and at least one functional group reactive with an ethylenically unsaturated bond containing group.* It is noted that independent claim 11 already recites the requirement of compound (C).

In addition, in accordance with the request by Examiner Salvitti and Mr. Mark Eashoo, Applicants have amended both claims 1 and 11 to recite that the bonding between the urethane polymer chain and the linkage group happens at the terminal of the urethane polymer chain. It was noted by Examiner Salvitti and Mr. Mark Eashoo that none of the Bontinck et al. and Joffre et al. teach or fairly suggest this feature.

The basic structure of vinyl-urethane copolymer of the present invention has the triad structure consisting of at least one vinyl polymer chain, at least one urethane polymer chain and a Si-O linkage segment. This situation can be portrayed as shown in the following schematic representation.



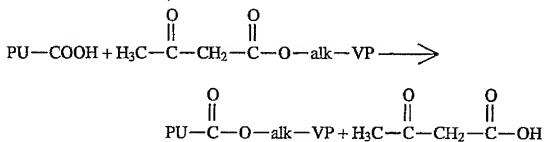
Please note that "V" in the figure means a unit derived from a vinyl group, "PV" is a polyvinyl chain, "PU" is a polyurethane chain and "PS" is a silicone chain.

On the other hand, while Bontinck, the main reference cited in the outstanding Office Action discloses that a vinyl-urethane copolymer consisting of a vinyl polymer chain and an urethane polymer chain, Bontinck fails to disclose the vinyl-urethane copolymer comprising an Si-O linkage segment wherein the urethane polymer segment bonds to the linkage segment at a terminal of the urethane polymer segment.

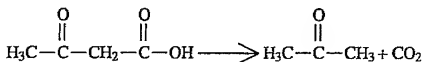
Furthermore, Bontinck recites in column 3, lines 16-20 that the vinyl-urethane copolymer therein is produced by the formation of ester bonds between the acid function of the anionic salt groups of the polyurethane polymer and the chain-pendant acetoacetoxyalkyl ester groups of the vinyl polymer. Please see Reaction Scheme below. There is no reason for or any necessity of the inclusion of linkage segment between a vinyl polymer chain and a vinyl urethane chain. That

is, a urethane polymer and a vinyl polymer in the compound of Bontinck link together without spacer in those ends. Therefore, the compound of Bontinck is quite different from the vinyl urethane copolymer of the present invention in the point of the chemical structure.

(Reaction Scheme in Bontinck: column 3)



and



As such, serious patentable distinctions exist between the present invention and the teachings of Bontinck.

Applicants respectfully submit that Joffre fails to cure the deficiencies of Bontinck. Joffre relates to an aqueous dispersion of a crosslinked silicon-modified organic polymer. Indeed, Joffre discloses a method of forming an aqueous dispersion of a crosslinked silicon-modified organic polymer and describes polyurethane as a linking radical used in the organic polymer (column 5, line 59).

However, Joffre only teaches the organic polymer including silicon modified organic polymer, and does not describe any silicon modified organic polymer derived from the usage of both urethane polymer and vinyl polymer. Especially, it is not described or suggested that the vinyl polymer chain is a residue of a polymer derived from an ethylenically unsaturated

monomer (B) and a compound (C) as monomer components, wherein the compound (C) comprises at least one functional group reactive with a silicon-containing hydrolyzable group and at least one functional group reactive with an ethylenically unsaturated bond-containing group.

The Examiner asserts that Bontinck teaches the urethane polymer is a residue of a urethane polymer (A) having at least one reactive group (free hydroxyl groups - analogous to the silicon-containing group for the purposes of bonding the vinyl and urethane chains). Namely, the Examiner considers Bontinck's urethane polymer to be equivalent to the urethane polymer of the present invention. However, as understood by those skilled in the art, these reactive groups in Bontinck's urethane polymer differ structurally and functionally from that of the present invention. Therefore, both are not equivalent at all. As mentioned earlier, while one of distinguishing features of the present invention is a usage of a silicon-oxygen bond, the urethane polymer in Bontinck is linked to the functionalized vinyl resin without using a silicon-oxygen bond.

Furthermore, an object of the present invention is to provide a vinyl-urethane copolymer that can form cured articles having excellent hot-water resistance, water resistance, heat resistance, and weather resistance, even though it is water-based (aqueous), and to provide a method that can efficiently produce the vinyl-urethane copolymer. Another object of the present invention is to provide a method for efficiently producing a vinyl-urethane copolymer even without using an organic solvent.

On the other hand, an object of the invention of Bontinck is to provide novel aqueous self-crosslinkable resin compositions comprising an aqueous dispersion of polyurethane and vinyl polymers (column 1, lines 5-7). However, there is no motivation provided to the artisan in Bontinck to set up a linkage segment in order to complete the object of the present invention.

Similarly, an object of the invention of Joffre is to provide a method of forming an aqueous dispersion of a preformed silicon modified organic polymer (abstract, claim 1). However, there is no motivation provided to the artisan in Joffre to set up a linkage segment in order to complete the object of the present invention.

The present invention has accomplished these objects described above. Consequently, water-based treating agents such as adhesives and coating agents can be obtained by using the vinyl-urethane copolymers. They are water-based and thereby are highly safe. They can yield coatings and other cured articles excellent in hot-water resistance, water resistance, heat resistance, and weather resistance despite the fact that they are water-based. Therefore, the vinyl-urethane copolymers according to the present invention are very useful as components for adhesives, sealing materials, and coating agents, as well as components for treating agents (treating liquids) such as binders, laminates, sealers, primers, and sizing agents, and components for cosmetics. These effects are superior and are peculiar to the present invention, i.e., they cannot be obtained from the cited references. Therefore, Applicants believe that the present invention and the inventions described in the cited references are quite different, and it is impossible to complete the present invention even if the descriptions in the cited references are combined.

As mentioned above, the present invention is not the same invention described in the cited references, and cannot be completed by the combination of the descriptions in these documents. As such, the present invention is patentable, and therefore should be allowed. Reconsideration and withdrawal of the rejections are respectfully requested.

Improper Finality

Applicants note that the Examiner has cited new references in the outstanding Office Action and yet has made the outstanding Office Action final. The Examiner has indicated at page 9, last full paragraph, that the August 17, 2009 Amendment necessitated these new grounds of rejection. However, the August 17, 2009 Amendment did not necessitate this new ground of rejection. Specifically, the newly added clause did not further limit claims 1 and 11. As such, Applicants respectfully request that the finality of the outstanding Office Action be withdrawn.

CONCLUSION

In view of the above remarks, it is believed that claims are allowable.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Garth M. Dahlen, Ph.D., Esq. (Reg. No. 43,575) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By 

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